A QUESTION OF THE WATER AND OF THE LAND

A

QUESTION OF THE WATER AND OF THE LAND

BY

DANTE ALIGHIERI

TRANSLATED INTO ENGLISH, WITH AN INTRODUCTION AND NOTES BY

CHARLES HAMILTON BROMBY

LONDON
DAVID NUTT, 270–271, STRAND
1897

Printed by Ballantyne, Hanson & Co.
At the Ballantyne Press

CONTENTS

	PAGE
INTRODUCTION	7
A QUESTION OF THE WATER AND OF THE LAND	17
QUESTION	18
FIRST REASON	19
SECOND REASON	20
THIRD REASON	21
FOURTH REASON	22
FIFTH REASON	23
ORDER OF THE QUESTION	24
DETERMINATION IN TWO MODES	25
FIRST AND SECOND SUPPOSITION	26
DESTRUCTION OF THE FIRST MEMBER	27
DESTRUCTION OF THE SECOND MEMBER	31
HE CONCLUDES THAT THE WATER IS CONCENTRIC	34
HE ARGUES CONTRA; AND FIRST	35
HE ARGUES AGAINST THE THINGS THAT HAVE BEEN DETERMINED	36
THE PRECEDING REASON IS MET BY AN OBJECTION	39
THE OBJECTION IS ANSWERED	40
OF THE EFFICIENT CAUSE OF THE ELEVATION OF THE LAND	48

INTRODUCTION

My apology for making a translation of this treatise into English is that no one else has done it. Of all the authentic works of Dante this alone remains untranslated. Professor Longhena, many years ago, translated it into Italian; besides that, I know of no one else who has put it into any modern language. And yet it has a peculiar interest apart from the fact that it is undoubtedly authentic.* It is Dante's latest

* I need not trouble the reader with all the arguments for and against the authenticity of the work. It breathes of Dante throughout. It seems, indeed, far more probable that Dante did write it, than that any one should have caught his style so closely, should not only have searched through his authorities with a care altogether out of proportion to any possible gain to be got by the perpetration of a forgery, and should have shown the same peculiarities in his quotation of many of those authorities. For some of these "undesigned

work, written a year before his death, and probably after the "Paradiso" was completed. It is interesting, too, as the only work of the kind we have from him, and it shows him in a new light, taking a part in the scientific discussions of the day. It is also most interesting as a specimen of the class of questions which were discussed then, and the manner of dealing with them. It is a good example of the intellectual exercises, or tournaments, in which men of intelligence and learning delighted at that time. And though it was not, perhaps,

coincidences" I may refer the reader to Dr. Moore's "Studies in Dante," especially pp. 105, 106.

As an example of the reasons given against its authenticity I may give one of Scartazzini's—that the idea of the tides being caused by the moon was undreamt of in Dante's day. Even if it was true that such a theory had not been known before Dante's time, it does not follow that the "Quæstio" is not a work of his, who in many ways was before his age. But, in fact, as is pointed out by Mr. Paget Toynbee, in his interesting article, published in a French magazine called *Romania*, in July 1895, the theory was known before Dante's time, and is mentioned by Albertus Magnus, who died in 1280, and who, when speaking of the moon, says, "ideo mare et omne humidum movet ex seipsa" (Tract 1, cap. 2).

intended as a very serious question, it is handled with all the seriousness of his grave nature, and is written in his most argumentative style. The excuse for writing it, that his enemies might not speak untruthfully of his views on the subject behind his back, and the bitter, if half humorous, sarcasm at the end, on those who would not come to hear the discourse, is typical of Dante.

I have ventured to add some notes of explanation and reference, but I have not attempted any thing like a commentary. To attempt a commentary would require more time and space than I am prepared to give, and I shrink from being the first to endeavour to explain some of the reasonings and expressions which I confess seem to me obscure and difficult.

To understand Dante's conception of the universe it is necessary to know something of the theories of the world and its surroundings as held by the principal astronomers among the ancients, Aristotle, Hipparchus, Ptolemy. Ptolemy, indeed, did little beyond enlarging on the teaching of Hipparchus, and drawing his

conclusions from that other's observations.* Hipparchus was, perhaps, the greatest astronomical genius, considering his want of instruments, and the paucity of previous observations, that the world has produced. At Dante's time little progress had been made in the twelve hundred years since Ptolemy made his calculations.

The idea of the universe through all that time, and for a long while before and after it, was of a great transparent hollow ball, with a geometric or imaginary line, running from its most northern to its southern point, or pole,† round which imaginary axis the great hollow ball, or sphere,

* "Le plus célèbre, sans contredit, mais non le plus veritablement grand astronome de toute l'antiquité." "Nul n'a été loué avec plus d'exageration" (Delambre).

† The Greek word πόλος, from which we get "pole," originally meant a ball, and was at first used to designate the cavity of the heavens as it is seen from the earth. So it came to mean a hemisphere, thence it was applied to the basin in which the earliest sundials were made, then to the central point in the hemisphere, or apex of the celestial sphere, with a line drawn from that apex, through all the other spheres, and on to the central point in the antarctic circle (see Sir G. C. Lewis' "Astronomy of the

revolved. In the sides of this sphere, which was called the eighth heaven, or the heaven of the stars, the fixed stars were fastened. These stars were also believed to be balls or spheres. In the space inside the large ball came a number of other spheres, all revolving round the imaginary line. First came the sphere of Saturn in which that planet was placed, and which carried the planet round with its own peculiar motion, and was called the seventh heaven, or heaven of Saturn.* Next came Jupiter in its sphere under similar conditions, the sixth or heaven of Jupiter. Next after Jupiter came Mars in the same way, called the fifth heaven or heaven of Mars; and

Ancients"). In the fourth chapter of the second book of the "Convito," Dante says that each heaven "di sotto del Cristallino," has two poles, "poli fermi quanto a se," while the ninth, the Crystalline heaven, or Primum Mobile, has them, "firmi e fissi e non mutabili secondo alcuno rispetto" —*i.e.*, as regards any other thing.

* I leave out of this necessarily slight sketch the complicated system of many several spheres, and epicycles, assigned to the planets by Aristotle and other ancient astronomers, by which they attempted to account for the irregular movements of the planets.

then the Sun, which was also supposed to be a planet, in its heaven, the fourth. Between the Sun and the Earth were Venus, Mercury, and the Moon, each giving its name to its own heaven, the third, second, and first respectively. The three planets above the Sun—*i.e.*, Saturn, Jupiter, Mars, were called the superior planets; Venus and Mercury between the Sun and the Moon, the inferior.

Such were the old conceptions of the surrounding heavens. The earliest men of science thought of them, and believed in them, as they appeared to them to be. But philosophers required something more. What made all these spheres to move? Ptolemy answered this by imagining an exciting energy outside the eighth or starry heaven, and which in Dante's time was known as the Primum Mobile, or ninth heaven—an active sphere moving from east to west giving force or motion to all the other spheres.

This was not sufficient for Christian philosophers. They accepted the Primum Mobile as giving force or motion to the other heavens, but beyond that again they taught there was a tenth

heaven, the Empyreum, emphatically the abode of the Almighty and His angels, although in some way the other lower heavens, according to Dante at least, were indeed portions of the heaven of heavens.*

In the centre of this system came the earth. What the precise idea of the form of the earth was in Dante's time is doubtful.† Some seem to imagine that it was supposed to be a flat circular surface like a round table. This could not have been so, at any rate to the more learned of his day. Aristotle, Hipparchus and Ptolemy, had taught that the earth was a sphere, transfixed by the great pole which ran through the universe.

* Dante gives his own peculiar and beautiful reason for the exceeding great and incomprehensible swiftness of the ninth heaven, the Primum Mobile, in its intense desire, "ferventissimo appetito," to become one with the highest heaven, "quello divinissimo cielo quieto," quiet and at peace because it has all its desire, "lo luogo di somma Deita." (Con. II. iv.) The heaven of the peace divine (Par. ii. 112, and Ep. to Can Grande, p. 24, 25).

† In the "Convito" II. vii. Dante shows that he not only knew the earth was a sphere, but that he was not so very far off its actual size, namely that it was 3250 miles to the centre of it. In Con. IV. viii. he gives 6500 miles as its diameter.

But whatever they imagined the shape of the earth to be, its most learned inhabitants, in the Middle Ages, had no certain knowledge of any land beyond that of which they had experience themselves, had heard of from travellers, or were told about by the few great authorities they so implicitly trusted. In Dante's time the pillars of Hercules, close to where Gibraltar now is, was its western boundary, India its boundary on the east, because Orosius, who was contemporary with St. Augustine, said so. Their knowledge of northern countries was vague and indistinct, and a short way towards the equator in Africa soon brought them to the extreme habitable south.* Round this limited portion of land they imagined a great circular ocean to roll, called poetically here "Amphitrite." Beyond this ocean came a space large enough to allow the sphere of the fixed stars to revolve. For they believed that these stars with the sphere in which they were

* But in the "De Monarchia," Dante speaks of a people called the Garamantes, who dwell beneath the equinoctial, and ever have the light of day equal to the shades of night. And in the "Convito," III. v. 170, "Garamanti . . . come detto è, in su questa palla veggia il sole appunto sopra sè girare."

placed revolved round the earth, with a regular motion, once in every twenty-four hours.* The sun had its own motion in its sphere. In the earliest times it was believed to sink into the western ocean every night, and the people of Gades, the modern Cadiz, the most western inhabitants of the earth, declared they could hear the great hissing it made as it entered the water, so imaginative were they, or the poet who related this of them.

Both Heraclitus and Pythagoras had held that the earth revolved on its axis, but Aristotle and Ptolemy denied this, and said it was utterly impossible. Dante, of course, followed Aristotle. It would have seemed to him a scientific heresy to doubt Aristotle on such a point. A remarkable thing is that, far as the ancient and mediæval astronomers were from the truth, yet, as Sir G. C. Lewis points out in his "Astronomy of the Ancients," for all practical purposes their system was as good as ours.

* Dante gives the exact time of the revolution of the Primum Mobile as twenty-three hours and fourteen-fifteenths, "grossamente assegnando" (Con. II. iii.).

Besides Mr. Paget Toynbee's instructive article in *Romania*, I have made frequent use of Dr. Moore's learned and laborious work, "Studies in Dante." But I do not understand the references of the latter to Aristotle's "De Mundo." The treatise which goes by that title is spurious and of a later date. It has been pointed out to me that Simplicius in his commentary on the "De Cœlo," says, "*Περὶ ὀυρανου Ἀριστοτέλους πραγματείας ὁ Αλέξανδρος περὶ κόσμου φήσιν*"; this may account for Dante's calling the "De Cœlo" the "De Cœlo et Mundo."

I have used the text of Fraticelli, corrected, since this translation was made, here and there by the recent Oxford edition, to whose editor all students of Dante are under an unspeakable obligation, and the Oxford edition of Bekker's Aristotle of 1837.

A QUESTION OF THE WATER AND OF THE LAND

A Golden and most Useful Question proposed by Dante Alagherius, the Renowned Florentine Poet, concerning the Nature of the Twofold Elements, Water and Land*

To all and singular who shall see these presents, Dantes Aligherius of Florence, least amongst true philosophers, health in Him who is the Prince and Light of Truth.

§ i. Let it be known to you all that while I was at Mantua a certain question arose, which

* This heading is, of course, an addition of an editor. The first edition, that by Manfred de Monteferrato in 1508, is headed—"Quæstio florulenta ac perutilis de duobus elementis acquæ et terræ tractans," &c.

though often dilated upon, for show rather than for the sake of truth, remained still undetermined. Wherefore I, who have been from my childhood continually nurtured in the love of truth, could not bear to leave the said question unexamined, but it pleased me to show the truth about this matter, and to refute the arguments upon the other side, as well from love of the truth as from hatred of falseness. And lest the malice of many, who are wont to fabricate lies against the absent who are the objects of their spite, should behind my back alter those things which have been well said, I have desired to leave written by my fingers on this folio that which has been determined by me, and to show forth with the pen the form of the whole disputation.

Question.

§ ii. The question then was about the local position and figure, or form, of the two elements, to wit, of the water and of the land. And I mean here by form, that which the philosopher places in the fourth species of quality in the predica-

ments.* And the question was restricted to this, so that at the beginning of investigating the truth it might be sought out—whether the water in its sphere, that is, in its natural circumference, may be in any part higher than the land, which rises out of the water, and which we commonly call the habitable quarter; and it was argued that it did so for many reasons, of which some having been passed over on account of their foolishness, I have retained five, which seem to have some weight.

First Reason.

§ iii. The first was this: It is impossible that two circumferences unequally distant from one another can have the same centre; the circumference of the water and the circumference of the land are unequally distant; therefore, &c. Then it went on: since the centre of the land is the centre of the universe,† as is affirmed by

* Aristotle's "Categoriæ." Dante refers again to the "doctrina prædicamentorum" in his "De Monarchia," III. xv. 55.

† See Introduction.

all, and everything that has a position in the world different to it* is higher, it was concluded that the circumference of the water is higher than the circumference of the land, since the circumference follows everywhere the centre itself. The major of the principal syllogism is seen to be manifest through those things which are demonstrated in geometry, the minor through the senses, inasmuch as we see in some parts the circumference of the land to be included in the circumference of the water, in some parts to be excluded.

Second Reason.

§ iv. To the more noble body a more noble place is due;† the water is a more noble body than the land, therefore the more noble place is due to the water. And since a place is the more noble in so much as it is higher, because of its being nearer to the most noble continent,

* *i.e.* the centre of the earth.

† Aristotle, "De Cœlo," II. xiii. 3. *τῷ γὰρ τιμιωτάτῳ δίονται προσήκειν τὴν τιμιώτατην ὑπάρχειν χώραν.*

which is the first heaven;* therefore, &c. I pass by that the locality of the water is higher than the locality of the land, and consequently that the water is higher than the land, since the situation of the place and of the thing placed does not differ. The major and minor of the principal syllogism of this reason were dismissed as if manifest.†

Third Reason.

§ v. The third reason was: Every opinion which is contradictory to sense is a bad opinion; to be of opinion that the water is not higher than the land is to be contradictory to sense; therefore it is a bad opinion. The first was declared

* Cœlum primum, the heaven of the moon (see Introduction).

† "Quasi manifeste." Longhena translates this "quasi manifestamente si excludevano." This cannot be Dante's meaning. At § xxiii. when he deals with this second reason he conditionally admits the truth of the major premiss, "to the more noble body a more noble place is fitting," and concedes the minor, "The water is a more noble body than the land." Manifeste stands for manifestæ.

to be evident by the commentator in the third book "De Anima":* the second, or minor, by the experience of sailors who behold, when at sea, the mountains beneath them; and they prove it by saying that by going up the mast they see them, while from the deck they do not see them; which seems to happen from this, that the land is much lower and deeper down than the ridge of the sea.

Fourth Reason.

§ vi. Fourthly, it was thus argued: If the land was not lower than the water, the land would be altogether without water, at least in the uncovered part, about which we are inquiring; and so there would be neither fountains, nor rivers, nor lakes, of which fact we see the opposite; wherefore the opposite, which followed from that, is true, that the water is higher than the land. The consequence is proved by this

* Aristotle's treatise "De Anima," the commentator is Averroes (see note †, p. 41).

that water is naturally brought down from above; and since the sea is the principle of all waters (as is shown by the philosopher in his treatise on Meteors*), if the sea was not higher than the land, the water would not be moved towards the earth, since that in natural motion the principle of the water must be higher.†

Fifth Reason.

§ vii. Also it was argued fifthly: the water is seen particularly to follow the motion of the moon, as is shown in the ebb and flow of the sea; and since the orb of the moon is excentric,‡ it seems reasonable that the water in its sphere should imitate the excentricity of the orb of the moon, and consequently be excentric; and since this could not be unless it was higher than the earth, as was shown in the first reason, the same conclusion follows as before.

* Aristotle's "Meteorologica," where he says, "*καὶ διότι τελευτὴ μᾶλλον ὕδατος ἡ ἀρχὴ ἐρτιν ἡ θάλαττα.*"

† Than that of which it is the principle or origin.

‡ *i.e.* having its circumference not at all parts equally distant from its centre.

§ viii. By these reasons, therefore, and others we need not care about, those endeavour to show that their opinion is true who hold that the water is higher than that portion of the land which is uncovered, or habitable, however much sense and reason is against it. For as to sense, we see throughout the whole land, as well south as north, as well east as west, the rivers descend to the sea; which would not be if the source of the rivers, and the course of their beds, were not higher than this level of the sea. As to reason, it will appear further on; and this will be demonstrated by many proofs in showing or determining the position and form of the two elements, as was touched upon above.

Order of the Question.

§ ix. This will be the order. First, it will be demonstrated that it is impossible that the water in any part of its circumference is higher than the land which emerges from it, or lies uncovered by it. Secondly, it will be demonstrated that this emerging land is everywhere higher than the

whole level of the sea. Thirdly, an objection will be made to these demonstrations, and the objection will be answered. Fourthly, the final and efficient cause of this rising or emerging land will be shown. Fifthly, an answer will be given to the arguments mentioned above.

Determination in Two Modes.

§ x. I say then firstly that if the water, looked at as to its circumference, should be in any part higher than the land, this would be necessarily in one of these two modes: either that the water should be excentric, as the first and fifth reasons advanced; or that being concentric* it should be gibbous† in some part, in such a way that it should rise above the land; it could not be in any other way, as is abundantly clear to any one

* All the texts appear to read "excentrica existens." I venture to conjecture that this is an error for "concentrica." The diagram and the argument in § xiii., "quod aqua non potest esse *concentrica* terræ, nisi sit in aliqua parte gibbosa . . . " confirm the reading I suggest.

† *i.e.* with a hunch or part protruding beyond the regular line of its circumference.

who examines the matter deeply. But neither of these two modes is possible; therefore, neither is that from which, or by which, the other followed. The consequence, as is said, is manifest through the argument * founded on a sufficient division of the cause; the impossibility of the consequent will appear through those things which will be shown.

First and Second Supposition.

§ xi. For the clearness of what is about to be said, two things are to be supposed. The first is that water is naturally moved downwards, the second is that water is of its nature a gliding body, and not brought to a stop of its own accord. And if any one should deny these two bases, or either of them, the determination of the question will not be for him; because it cannot be disputed about any science with one who denies the very bases of that science, as is seen in the first book of the "Physics;" † because these bases are discovered by the senses and by

* "Per Locum"—for the various logical uses of "Locus" see "The Topics" of Cicero, 2, *et seq.*

† Aristotle's "Physics," I. ii.

the induction of those whose lot it is to discover such things, as is shown in the first book to Nichomacus.*

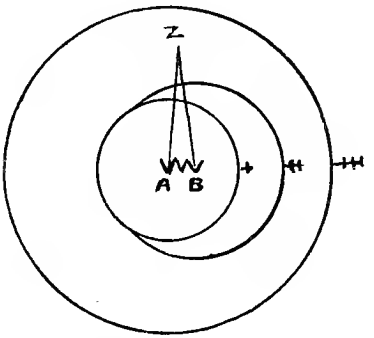
Destruction of the First Member.

§ xii. To the destruction, then, of the first member of the consequent, I say that it is impossible that the water can be excentric, which I demonstrate thus. If the water was excentric, three impossible things would follow, the first of which is that the water would naturally be movable upwards and downwards; the second is that the water would not be moved downwards by the same line with the land; the third is that weight would be ambiguously predicated of them; all which things are seen to be not only false, but impossible. The consequence is shown thus: Let the heavens be the circumference where the three crosses are placed, the water where there are two, the land where there is one, and let the centre of the heavens and of the land be at

* Aristotle's "Nichomachean Ethics," I. vii. 21.

the point A, but the centre of the water excentric* be at point B, as is shown in the accompanying figure. I say, then, that if there shall be water at A, and it has a passage, it will naturally be moved to B, because everything that is heavy is

FIG. 1.



naturally moved to the centre of its own proper circumference; and since the movement from A to B is a movement upwards, for A is simply the bottom of all things,† water will naturally be moved

* *i.e.* having a centre different from the common centre of the universe and the land.

† Because it is the centre of the universe.

upwards, which was the first impossibility which was stated above. Next let there be a clod of earth at Z, and at the same place a quantity of water and no obstacle in the way. Since then, as was said, every heavy thing is moved towards the centre of its own proper circumference, the clod of earth will be moved by a straight line to A, and the water in a straight line to B. But this will happen by different lines, as is shown in the accompanying figure, which is not only impossible, but would make Aristotle laugh if he heard it; and this was the second matter which was to be made clear. The third matter, then, I show is this: heaviness and lightness are qualities of simple bodies, which are moved with a straight motion, and light things are moved up and heavy things down. For this I mean by heavy and light, namely, that which is movable, as the philosopher says in his "Cœlum et Mundum."*

* There is no such work by Aristotle to whom Dante always applies this title, the quotation is from his work "περὶ ὀυρανου," or "De Cœlo," IV. i., "βαρὺ γὰρ καὶ κῦφον τῷ δύνασθαι κινεῖσθαι φυσικῶς πως λέγομεν." The book περὶ κόσμου, or "De Mundo," which has often passed as a work of Aristotle, was much later (see Introduction).

So then the water would be moved to B, the clod of earth, on the other hand, to A; since both are heavy bodies, they will be moved downwards to different points, of which there cannot be one law, since one is downwards simply, the other in a manner peculiar to itself. * And since diversity in the law of ends argues diversity in those things which are on account of them, it is manifest that there will be a different law of movement † in the water and in the land; and since diversity of law with identity of name makes an ambiguity, as is shown by the philosopher in his "Antepredicaments,‡ it follows that weight is used ambiguously of the water and of the earth, which was the third member of the consequence to be declared. Thus, therefore, it appears by a true demonstration of their genus, by which I have shown that this is not, that is, that the water is not excentric, which was the first of the succeeding principal consequence which had to be destroyed.

* Secundum quid.

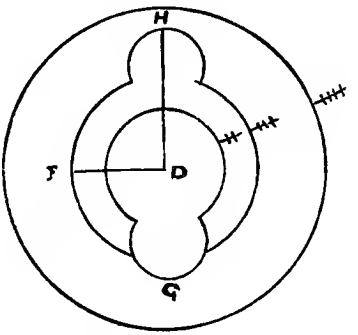
† Ratio fluitatis.

‡ Aristotle's "Categoricæ," I. 1–4.

*Destruction of the Second Member.**

§ xiii. To the destruction of the second member of the succeeding principal consequence I say that it is altogether impossible that the water is

FIG. 2.



gibbous, which I thus demonstrate.† Let the heavens be where there are four crosses, the

* That the water is gibbous.

† Dr. Moore says ("Studies in Dante," p. 128), "The diagram and argument based upon it is taken almost directly from the 'De Cœlo,' II. iv. (287 b, 4–14)"; but here this generally accurate writer is strangely in error. Aristotle is seeking to

water where there are three, and land where there are two, and the centre of the land and of the water concentric, and of the heavens, be at D. And let this be known beforehand that the water cannot be concentric with the land, unless the land be gibbous in some part above its central circumference, as is clear to those who are instructed in mathematics. If in any part the circumference of the water rises up, and so let the gibbousness of the water be at H, the gibbousness of the land at G; then let a line be drawn from D to H, and a line from D to F. It is manifest that the line which is from D to H is longer than that from D to F; and by this its summit is higher than the summit of the other; and since both of them touch in its summit the superficies of the water and do not pass beyond it, it is clear that the water is upwards with regard to the superficies

prove another point in the chapter cited; the diagram he describes is totally different, while in the argument which it illustrates there is only a very slight connection with the following argument of Dante. Indeed, the sentence quoted in the following note (p. 33) is nearly the only common ground between the two passages.

where F is. When, therefore, there is nothing there to prevent it, if those things are true which were first assumed, the water of the gibbous part will flow down until it will be at a level at D,* with the central or regular circumference; and so it will be impossible for the gibbousness to remain or to be, which was to be demonstrated. And besides this most powerful demonstration, it can be shown probably† that the water has not a gibbousness outside its regular circumference; because that which *can* be done in one way it is better it *should* be done in one way than in several;‡ but all § might be done by the gibbousness only of the earth, as will appear below; therefore there is no gibbousness in the water, since God and Nature do and will that which

* ὥστε περιρρεύσεται τὸ ὕδωρ ἕως ἂν ἰσασθῇ. "De Cœlo," II. iv. 12.

† Probabiliter, with probability as opposed to certainty.

‡ See "De Mon." I. xvi. (at the beginning), "Et quod potest fieri per unum, melius est fieri per unum quam per plura." Both these quotations are from Aristotle's "De partibus Animalium," III. iv. 5. ἀρχὴν δὲ τούτων ἀναγκαῖον εἶναι μίαν ὅπου γὰρ ἐνδέχεται βέλτιον ἢ πολλας.

§ "Totum oppositum potest fieri."

is better,* as is shown by the philosopher in his "De Cœlo et Mundo," and in his "De generatione Animalium.† Thus, therefore, it is impossible for the water in any part of its circumference to be higher—that is, further from the centre of the world—than the surface of this habitable land is, which was the first in the order of the things to be said.

He concludes that the Water is Concentric.

§ xiv. If, therefore, it is impossible that the water is excentric, as was demonstrated by the first figure, or that it has any gibbousness, as by the second was demonstrated, it is necessary that it must be concentric and level—that is, equally distant from the centre of the world in every part of its circumference, as is clear of itself.

* ὁ δὲ θεός καὶ ἡ φύσις οὐδὲν μάτην ποιοῦσιν. Aristotle, "De Cœlo," I. i. 6.

† ἐπὶ δ οὐθὲν ποιεῖ περίεργον οὐδὲ μάτην ἡ φύσις. Aristotle, "De generatione Animalium," II. vi. 38.

He argues Contra; and first.

§ xv. Now I argue in this way: whatever rises above any part of a circumference which is equally distant from the centre, is more remote from that centre than any part of the circumference. But all the shores, both of Amphitrite herself,* as well as the shores of the mediterranean seas,† are above the level of the contiguous sea, as is patent to the eye: therefore all the shores are more remote from the centre of the world, since the centre of the world is also the centre of the sea (as has been seen), and the surface of the shores are parts of the whole surface of the sea. And since every thing which is more remote from the centre of the world is also higher, it follows that all the shores are above the whole sea, and if the shores, much more the other regions of the land; for the shores are the lower parts of the land, and this the rivers show, for they flow down to them. The major, indeed, of this demonstration is demonstrated by

* Amphitrite, the goddess of the sea, put for the ocean itself.

† Marium mediterraneorum, inland seas generally.

geometric theorems, and the demonstration is palpable to the senses, although it has its own force, as in those things which were demonstrated above *per impossibile*. And so it is clear of the second.

He argues against the Things that have been Determined.

§ xvi. But against these things that have been determined it is argued in this way: the heaviest body seeks the centre equally on all sides, and most powerfully. The land is the heaviest body; therefore it seeks the centre equally on all sides, and most powerfully. And from this conclusion it follows, as I shall make clear, that the land is equally distant from the centre in every part of its circumference, by that which is called "æqualiter"; and that it is the "substans"* of all bodies, by reason of that which is called "potissime"; from which it would follow (if the water was concentric as it is said to be) that the land would be covered

* "Substans," standing under, supporting "æqualiter," equally; "potissime," most strongly.

and lying hid; the contrary of which we see. That these things follow from the conclusion I thus make clear. Let us postulate as the contrary, or opposite, of this conclusion, which is that it is equally distant in every part, and let us say that it is not distant; and let us postulate that at one part the surface of the land is distant twenty stadia,* and at another ten; and so that one hemisphere of it will be of greater quantity than the other, and it does not matter whether they differ little or much in distance so long as they do differ. Since, then, of the greater quantity of land there is a greater power of weight, the larger hemisphere, through the prevailing force of its weight, will press upon the smaller hemisphere, until the quantity of both shall become equal, by which equality the weight will become equal; and so on all sides it will be brought back to the distance of fifteen stadia, as we see in the weighing and adjusting of the weights in the balances. By which it is evident that it is impossible that land equally tending to the centre can be distant

* The stadium — *i.e.* the Olympic stadium — was 606¾ feet.

from it differently or unequally in its circumference. Therefore it is necessary that its opposite is unequally distant; which is to be equally distant when it may be distant;* and so the consequence is made clear from the part of that which is to be equally distant. Which also follows, that it is the "substans" of all bodies (which was also said to follow from the conclusion), so I declare. The most powerful virtue most powerfully attains its end; for through this it is most powerful, because it is the quickest, because most quickly and easily it can arrive at its end. The most powerful virtue of gravity is in a body which most powerfully tends to the centre, which indeed is the land: therefore it most powerfully attains the end of gravity which is the centre of the world; therefore it will be the "substans" of all bodies, if it most powerfully seeks the centre, which was to be made clear in the second place. So, therefore, it appears to be impossible that the water is concentric with the land, which

* "Quod est æqualiter distare, quum distet." The whole of this paragraph (16) is probably corrupt, or possibly added to by a later hand.

is contrary to the things which have been determined.

*The preceding Reason is met by an Objection.**

§ xvii. But this reason does not appear to demonstrate, because the proposition of the principal major in like manner does not seem to be necessary. For it was said that the heaviest body equally, everywhere, and most powerfully tends to the centre, which does not seem to be necessary, because allowing that the land is the heaviest body compared with other bodies, yet compared with itself, that is with its different parts, it may be heaviest and not heaviest, because the land may be heavier in one part than in another. For, since the adequation of a heavy body is not made by quantity, *quâ* quantity, but by weight, there may be here an adequation of weight, where there may not be an adequation of quantity, and so this demonstration is apparent and not real.

* Per instantiam = ἔνστασις, an objection. Aristotle, "Anal. pr." II. xxvi.

The Objection is Answered.

§ xviii. But such an objection is naught, for it proceeds from ignorance of the nature of homogeneous and simple bodies; for bodies are homogeneous and simple; homogeneous as purified gold, and simple bodies as fire and earth, which in their parts are regularly qualified by every natural quality. Whence, since the land is a body simple regularly in its parts, it is qualified naturally, and of itself, so to speak: wherefore, since gravity is inherent naturally in the land and the land is a simple body, it is necessary that it should have regular gravity in all its parts, according to the proportion of the quantity, and so the reason of the principal objection disappears. Whence it must be answered that the reason of the objection is sophistic, because it is fallacious, "secundum quid" and "simpliciter propter quod." * It must be understood that universal Nature is not frustrated

* *i.e.* it confuses the incidents of homogeneous and simple bodies; it argues from a proposition which applies only in certain particular cases as though it applied in all cases,

of its end; although particular Nature sometimes through the disobedience of matter is frustrated of its intended end, yet universal Nature in no way can fail of its intention, since both the act and potentiality of things,* which can and can not be, are subject to universal Nature. But the intention of universal Nature is that all forms which are in the potentiality of the first matter may be reduced into act, and may be in act according to the law of the species; that the first matter according to its whole totality may exist under every material form, although according to its part it may be under every opposite privation except one. For since all forms which in idea are in the potentiality of matter, are in act in the Mover of the Heavens, as says the commentator in his "De substantia orbis;"† if all these forms were not

and thus is fallacious "secundum quid"; and it assigns a wrong reason for the phenomena it seeks to explain, and so is fallacious "simpliciter propter quod."

* "Actus et potentia." Potentia, the possibility of becoming to be of a certain kind or in a certain way, or power of doing an act, whether in use or not; actus, the being or the act itself; the putting the potentia into force.

† The "De substantia orbis" of Averroes. "Averrois che

always in act, the Mover of the Heavens would fail in the completeness of the diffusion of His goodness,* which is not to be spoken of. And since all material forms of things which are generated and liable to corruption, except the forms of the elements, require matter and a mixed and complex subject, to which, as to its end, the elements are ordained, *quâ* elements; and a mixing cannot be where things are not capable of being mixed together, as is obvious of itself: it is necessary that in the universe there must be a part in which all things capable of being mixed, to wit, the elements, can come together; but this could not be unless the land in some part should emerge, as is evident to any one who gives attention. Whence, since all Nature † obeys the intention of

l'gran commento feo," Inf. iv. The "form" in logic is that which makes a thing to be what it is. Thus a statue is in potentiality in the marble before it becomes by act a statue; when it receives its form, it becomes that which it is—a statue.

* "Deficeret ab integritate diffusionis suæ bonitatis," that is, if the Creator allowed His power to remain in abeyance, in potentiality, and not in act, His goodness would not be fully diffused.

† All the particular or individual parts of Nature. The

universal Nature it was necessary that besides the simple nature of the land which is to be downwards from above, there should be in it another nature by which it should be obedient to the intention of universal Nature; as, to wit, that it should be subject to be raised up in some part by the influence of the heavens, as if obedient to a teacher: as we see in the case of concupiscence and irascibility in man, which, though, through their own impetus they are carried away according to the sensitive affection, yet in so far as they are obedient to reason, they are sometimes drawn back from their own natural inclination,* as appears in the first of the "Ethics." †

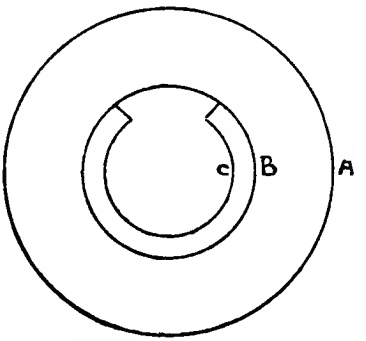
distinction between universal and particular Nature is taken from the "Physica" of Albertus Magnus, Lib. ii. Tract. i. cap. v. See Dr. Moore's "Studies in Dante." The same distinction is made in Conv. I. vii. In Conv. III. iv. he says "la natura universale cioè Iddio." Compare also Conv. IV. ix. and IV. xxvi. "ordinato per provvedimento di natura universale, che ordina la particulare alla sua perfezione." And see note to this last passage in Fraticelli's edition.

* "A proprio impetu." Longhena translates this: "talvolta per impeto proprio," which spoils the argument.

† Aristotle's "Ethics," I. xiii. 15–17. And see "Ethics,' VII. 1–6 *seq.*

§ xix. And so though the earth according to its simple nature tends equally to the centre, as was said in the argument of the objection, yet according to a certain nature it is subject to be raised up in part, obeying universal Nature, so that a mixing may be possible, and in this way the concentricity of the land and the water is preserved;

FIG. 3.



and nothing impossible follows with those who philosophise aright,* as is shown in this figure. Let the heavens be the circle where A is, the

* No impossible result ensues when one considers these things philosophically.

water the circle where is B, the land the circle where is C; and it matters not, as far as the true proposition is concerned, that the water should be little or far distant from the land. And let it be understood that this is true,* because it is such as is the form and site of the two elements, the two others above are false,† and are given not because it is so but that the learner may understand, as he says in the first book of the "Priores."‡ And that the land emerges gibbously and not by a central circle of circumference is indubitably evident, when the figure of the emerging earth is considered. For the figure of the emerging earth is that of a half-moon, which it in no way could be, if it should emerge according to a regular or central circumference; for, as it is demonstrated in mathematical theorems, it is necessary that the regular circumference of a sphere should always emerge with a circular horizon from a plain or spheric superficies, such as the superficies of the water must be. And that the emerging earth

* *i.e.* the figure.

† The two other figures.

‡ Aristotle's "Prior Analytics."

should have a figure equal to that of a half-moon is manifest both from the naturalists who treat of it, and from astronomers who describe climates, and by geographers who mark the regions of the earth through all the different quarters. For as it is commonly held by all, this habitable world is extended by a longitudinal line from Gades which is placed above the western confines from Hercules,* up to the mouth of the river Ganges, as Orosius writes.† Which longitude indeed is so great that, while the sun is setting, when it is in the equinoctial line, to those who are at one of the termini, it is rising to those who are at the other, as was discovered by astronomers by the eclipse of the moon. Therefore it must be that the boundaries of the aforesaid longitude are distant 180 degrees, which is the half of the distance of the whole circumference. By the line indeed of latitude as we commonly have it from these

* The Pillars of Hercules.

† Orosius, "Adversus Paganos," I. ii. 7-13. "Europæ in Hispania occidentalis oceanus termino est, maxime ubi apud Gades insulas Herculis columnæ visuntur . . . Asia ad mediam frontem orientis habet in oceano Eoo ostia flumina Gangis."

same people,* it extends † from those whose zenith is the equinoctial circle up to those whose zenith is a circle described from the pole of the Zodiac round the pole of the world,‡ which is distant from the pole of the world about 23 degrees, and so the extension of the latitude is about 67 degrees, and not more, as is clear to whoever pays attention. And so it is clear that the emerging land must have the figure of a half-moon, or thereabouts: because that figure is the result of so much latitude and longitude, as is evident. If, indeed, it should have a circular horizon, it would have a circular convex figure; and so the longitude and latitude would not differ in the distance of their boundaries, as it must be manifest even to women. And so it is clear concerning the

* Astronomers. † The earth.

‡ The pole of the Zodiac, or the pole of the ecliptic as it is generally called, is an imaginary pole at a point where a perpendicular line drawn from the sign of Pisces cuts the Arctic circle. A glance at the celestial globe will show the bearing of this argument better than a long note would. It will there be seen how the land part of the world appeared to be in Dante's time, something like the part marked C in the above diagram.

third proposition in the order of things to be spoken of.

Of the Efficient Cause of the Elevation of the Land.

§ xx. It remains now to see about the final and efficient cause of this elevation of the land, which has been sufficiently demonstrated: and this is the artificial order; for the question whether it be, ought to precede the question why it is. And about the final cause, let those things suffice which have been said in the foregoing distinction.* For, indeed, to investigate the efficient cause, it must be noted first, that the present treatise is not outside natural matter, because it deals with mobile entities,† that is to say, the water and the land, which are natural bodies, and about these things certainty must be sought according to natural matter, which is here the subject matter; for in each kind of genus certainty must be sought only as far as the nature of the thing admits, as

* Præmediata distinctione. The Oxford edition reads præmeditata.

† Inter ens mobile, *i.e.* material being.

is clear from the first of the "Ethics."* Since, then, innate in us is the course of investigating truth about natural things from those which are better known to us, but less known to Nature, to those which are more certain and better known to Nature, as is clear from the first of the "Physics;"† and since in such things the effects are better known to us than the causes, because by them we are led to the knowledge of the causes, as is clear, for instance, the eclipse of the sun led to the knowledge of the interposition of the moon, whence from wondering men began to philoso-

* Aristotle's "Ethics," I. iii. 4. And compare Con. IV. xiii. ll. 49–50. "Il disciplinato chiede di sapere certezza nelle cose secondochè la loro natura di certezza receva." And De Mon. II. ii. ll. 40–41. "Non similiter in omni materia certitudo quærenda est, sed secundum quod natura rei subjectæ recipit."

† Aristotle's "Physics," I. i. Fraticelli's reading of this passage, and Longhena's translation of it, are both hopeless. Dr. Moore improves the text by putting a comma after "notis," and "ad," which had doubtless dropped out by mistake, before certiora, and which corresponds with the "ἐπί" in the "Physics"; but by placing a full stop at "philosophari" he leaves the sentence incomplete and without its governing verb. By putting a comma after "philosophari," and no full stop till "potest," we get as the statement of the

phise; the cause of investigation in natural matter ought to be from effects to causes. Which course, indeed, though it may have sufficient certainty yet hath it not so much as the course of inquiry in mathematics hath, which is from causes, or higher matters, to effects or lower things: and so that amount of certainty must be sought which can be obtained in such demonstration. I say then that the efficient cause of this elevation cannot be the land itself; because since the being elevated is a certain being carried upward, and to be carried upward is contrary to the nature of the land: and nothing speaking of it *per se*,* can be the cause of this, which is contrary

whole sentence, "viam inquisitionis oportet esse," and though it is monstrously long it makes sense. The meaning I take to be that since principles are better known to Nature than details, while it is the reverse to us, we must reason from effects to causes, and not, as Nature is assumed to do, from causes to effects. The following is the passage in Aristotle:—

Πέφυκε δὲ ἐκ τῶν γνωριμωτέρων ἡμῖν ἡ ὁδὸς καὶ σαφεστέρων ἐπὶ τὰ σαφέστερα τῇ φύσει καὶ γνωριμώτερα . . .: ἀνάγκη τὸν τρόπον τοῦτον προάγειν ἐκ των ἀσαφεστέρων μὲν τῇ φύσει ἡμῖν δὲ σαφέστερων ἐπὶ τὰ σαφέστερα . . . κ. τ. λ.

* I have adopted the punctation of the Oxford text.

to its own nature; it remains that the land cannot be the efficient cause of this elevation. And in like manner, too, neither can the water; because since water is a homogeneous body, it behoves that virtue should be uniformly in every part of it; speaking of it *per se;* and thus there would be no reason why it should elevate here more than elsewhere. This same reason removes both air and fire from this causality; and since there remaineth none other * but the heavens this effect must be reduced to them, as though to its own proper cause. But since there are many heavens it yet remaineth to inquire to which, as though to its own proper cause, it is to be reduced. Not to the heaven of the moon; because the moon herself is the organ of her own virtue or influence; and she declines as much through the Zodiac from the equinoctial towards the Antarctic pole, as towards the Arctic, so she would elevate † on that side of the

* "Et quum non restet alterius nisi cœlum," Dr. Moore suggests reading "ulterius," though what sense he would make of it does not appear. Cœlum likewise he takes to mean the fifth element, or the *ἀιθήρ*, but this is inconsistent with the context.

† *i.e.* would raise the land up as much on the south of the

equinoctial as well as on this, which is not the fact. Nor does it avail to say that this declination cannot be because of its being nigher to the land through excentricity; for if there was this power of elevating in the moon (since nearer agents act more powerfully) it would elevate rather there than here.

§ xxi. This same reasoning removes from this kind of causality all the orbs of the planets; and since the Primum Mobile, that is the ninth sphere, is uniform throughout, and consequently uniformly imbued with power throughout, there is no reason why it should draw up more on one part than another. Since then there are no other mobile bodies except the heaven of the fixed stars, which is the eighth sphere, this effect must of necessity be reduced to that. For the evidence of which thing it should be known that while the heaven of the fixed stars hath unity in substance it hath also multiplicity in power, on which account it behoved that it should have that diversity in its parts which we see, so that through divers organs divers powers it might

equator, as on the north, which Dante assumes "non est factum."

shed abroad: and he who does not recognise these things, let him know he is outside the limits of philosophy. In it we see difference in the magnitude and in the light of stars, in the figures and images of constellations; which differences indeed cannot be for naught, as must be manifest to all who have been nurtured in philosophy. Whence different is the power of this star from the power of that, of this constellation and of that; and different is the power of the stars which are on this side of the equinoctial line, from those which are on that. Wherefore since the aspects of the inferior are similar to the aspects of the superior, as Ptolemæus says, it follows that this effect cannot be traced back to anything save to the heaven of the stars, as we have seen; because the similitude of the virtual agent dwells in that region of the heavens which operates upon this uncovered land. And since this uncovered land is extended from the equinoctial line to the line which the pole of the Zodiac describes round the pole of the world, as was said above; it is manifest that there is an elevating power in these stars, which are in the

region of the heavens contained by these two circles, whether it draweth up by way of attraction, as the magnet draws the iron, or by way of compulsion, by generating compelling vapours, as in some mountain parts.* But now it is asked: if that region of the heavens is moved in a circle why was not the elevation circular? I answer it was not circular because the material did not suffice for so great an elevation. But then it is further argued, and the question put: why was the hemispheral elevation rather on this side than on another? To this it is to be said, as the philosopher says in his second book of the heavens,† when one asks why the heavens are moved from the east to west and not the other way: where he says, indeed, that such like questions proceed either from much foolishness or great presumption, because they are above our intellect. So to this question it must be said, that as God the glorious

* Aristotle's "Meteorica," II. viii., *conf.* Purg. xxi. 56, "per vento che in terra si nasconda."

† Aristotle's "De Cœlo," II. v. Rather a free translation of "ἢ πολλῆς ἐνηθείας ἢ πολλῆς προθυμίας."

disposer, who determined the place of the nations, the position of the centre of the world, the distance of the extreme circumference of the universe from its centre, and other such like things, did them for the best, so also did He these. Thus when He said, "Let the waters be gathered together in one place, and let the dry land appear," so the heavens were endowed with virtue for to do, and the land with power to be be patient.

§ xxii. Let them cease then, let men cease to inquire into those matters which are above them, and let them seek so far as is within their grasp, that where'er they can they may draw* themselves up to things immortal and divine, and leave those which are too great for them. Let

* "Ut *trahant* se ad immortalia et divina pro posse." *Conf.* Convito IV. xiii. "e pero dice Aristotile nel decimo dell' Etica, contra Simonide poeta parlando, che l'uomo si dee *traere* alle divine cose quanto puo." Taken from Aristotle's "Ethics," X. vii. 8, ἐφ ὅσον ἐνδέχεται ἀναθατίζειν, or rather from Aristotle through St. Thomas Aquinas in his "Summa contra gentiles." "Philosophus dicit quod homo debet se ad immortalia et divina *trahere* quantum potest." See Dr. Moore's "Studies in Dante" on the evidence of this, and other passages, to the genuineness of the "Quæstio."

them hearken to friend Job where he says, "Wouldst thou comprehend the footsteps of God, and find out the Omnipotent even to perfection?" Let them hearken to the Psalmist saying, "Thy wisdom is made wonderful, and has been my comfort, and I shall not be able to attain to it." Let them hear Isaiah saying, "As far as the heavens are distant from the earth so far are my ways from Thy ways." It was spoken indeed in the person of God to men. Let them hear the voice of the Apostle to the Romans, "Oh height of the riches of the knowledge and wisdom of God, how incomprehensible His judgments and His ways not to be sought out!" And lastly let them hear the voice of the Creator saying, "Whither I go ye cannot come." And let these things suffice in the search of the truth ye strain after.

§ xxiii. These things being seen it is easy to refute the above made arguments on the other side, which was proposed to be done in the fourth place. When, therefore, it was said that there cannot be the same centre to two circumferences unequally distant from one another, I say that is true if the circumferences are regular without

hump or humps. And when it is said in the minor, that the circumference of the water, and the circumference of the land, are of this kind, I say this is not true, unless through a gibbousness which is in the land, and so the argument does not proceed. To the second, when it is said: To the nobler body a nobler place is due, I say it is true according to its own proper nature, and I concede the minor; but when the conclusion is drawn that therefore the water ought to be in a higher place, I say that it is true according to the proper nature of either body; but by a super-eminent cause (as was said above) it comes to pass that in this part* the land is higher; and so the argument was defective in the first proposition. To the third when it is said: Every opinion which is contradictory to the sense is a bad opinion, I say this argument proceeds from a false imagination. For sailors imagine when they are at sea that they do not see the land from the ship because the sea is higher than the land, but this is not so; indeed it would be the contrary, for

* The inhabitable part of the earth.

they would the rather see it. But this is because the direct ray of the visible object is broken between the object and the eye from the convexity of the water; for since it behoves that the water must have a round form everywhere about the centre, it is necessary that at a certain distance it should create an obstacle by its convexity. To the fourth when it was argued: If the land was not lower &c.; I say that this argument is founded in falsity; and so is naught. For the common people and the ignorant of physical arguments believe that water may ascend to the tops of mountains, and even to the place of fountains in the form of water; but this is very childish, for the waters are generated there (as is shown by the philosopher in his "Meteors"*), the matter ascending in the form of vapour. To the fifth where it is said that the water is a body which follows the orb of the moon; and from that it is concluded that it must be excentric; I say this reason has no necessity, because although a thing may imitate another in one particular it is not on that account

* Aristotle's "Meteorologica," I. ix.

necessary that it should imitate it in everything. We see that fire imitates the circular motion of the heavens, and yet it does not imitate them in not moving in a straight line, nor in not having the contrary of its own quality,* and so the reason proceeds not. And so much for the arguments. Thus therefore is determined the determination and the treatise on the form and site of the two elements, as was proposed above.

§ xxiv. This philosophy was determined when the unconquered Lord Duke Cane Grandi de Scala was ruling for the most holy Roman Emperor by me Dante Alagherius, least of philosophers, in the renowned city of Verona, in the Church of the Glorious Helena, before the whole Veronese clergy, except certain ones who burning with a too great charity,† admit not the questions of others, and poor by virtue of the humility of the Holy Spirit, lest they should seem to approve the excellence

* Fire sometimes has a circular motion, sometimes it moves in a straight line, and while its nature is upwards and in a pyramidical form, yet often it moves in another direction.

† Longhena translates this "di troppo amore di se," which is incorrect and spoils the intense sarcasm of the original.

of others, refuse to mix themselves up in their discourses. And this was made in the year from the nativity of our Lord Jesus Christ the thousandth three hundredth and twentieth, on Sunday, which our aforesaid Saviour through His glorious nativity, and by His wondrous resurrection hath intimated to us as by a sign that we should venerate it; which day was the seventh from the ides of January and the thirteenth before the kalends of February.

Printed by BALLANTYNE, HANSON & Co.
London & Edinburgh

PUBLISHED BY

David Nutt, in the Strand

THE TIME REFERENCES IN THE DIVINA COMMEDIA AND THEIR BEARING ON THE ASSUMED DATE AND DURATION OF THE VISION. By the Rev. Dr. E. Moore, Editor of the Oxford Dante, &c. Crown 8vo, cloth. Net, 3s. 6d.

*** Only a few copies remain of this important and authoritative monograph.

A DANTE MAP. Compiled by Mary Hensman. Printed in Colour by the Guild of Handycraft. With English and Italian Preface, and Index of Geographical Names mentioned by the Poet. Bound in buckram, with a Florentine lily on the side. Net, 7s. 6d.

*** Only a few copies left.

AUCASSIN AND NICOLETE. Done into English by Andrew Lang. 16mo, sewn, 1s. (1s. 2d. post free).

THE LIVES OF THE TROUBADOURS, Translated from the original Provençal of the Thirteenth Century, with specimens of the Poems of the Troubadours, translated into English for the first time, and accompanied with Introduction and Notes. By IDA FARNELL. 6s. net.

The old Provençal "Lives of the Troubadours" are the main source alike for the history of Provençal literature, and of information concerning the feeling and manners of the days of chivalry and the courts of love.

THE SONG OF ROLAND. A Summary, with Verse Translation of the Leading Passages. By FREDERICK SPENCER and ARTHUR S. WAY. 1s.

The best introduction in English to the study of the greatest of the *Chansons de Geste*, the masterpiece of French mediæval epic.

LONDON: DAVID NUTT, 270–271, STRAND.